

Chief, Engineering Division, OC

4 December 1951

STAT

Facsimile Reproduction Equipment (Faxcard), Activities concerned with the operation, performance and future applications of, as required by the Agency.

REFERENCE : (A) Letter to Chief, Machine Division, OCD concerning operation of subject equipment as of 1 June 1951.

ENCLOSURE : (A) Copy of Reference (A)
(B) Equipment Utilization Chart for 1950-1951.

1. Reference (A) was submitted for the primary purpose of satisfying the basic requirements of Contract [redacted] and supplement No. 1, [redacted]. Secondly, the report serves as a performance and progress report involving changes and recommendations effecting overall improvement. A copy is herewith submitted for your information.

50X1
50X1

2. To date, of the six transmitters and twelve receivers furnished by the Contractor, one transmitter and receiver is on temporary loan to the National Scientific Register, Federal Security Agency. One receiver is set up for operation in FBIS offices in Quarters "I" (for unclassified material only), one is located in the Engineering Shop for modification, and five transmitters and nine receivers are located in room 1333 M building.

3. Enclosure (B) presents a fair picture of equipment utilization from January 1950, when the Agency had one developmental model available, through October 1951, when five transmitters and ten receivers were available. (The bulk of the equipment was delivered in May 1950). The blue columns indicate the number of references scanned, the red columns the actual scanning time. For the month of October 1951, the scanning time of approximately 250 hours represents 30% of the total time available on all five transmitters for a normal work month. With approximately 20% of the equipment down for maintenance, the figure above can be raised to 40% of the total time available.

4. As explained in Reference (A) equipment maintenance and upkeep has been and will continue to be a problem until a majority of the changes recommended in paragraph 3, Reference (A) are effected. Within the next year, existing work load permitting, changes will be effected locally, one unit at a time.

DOC 1	REV DATE 12/3/80	BY 37169
ORIG COMP 33	OPI 56	TYPE 02
ORIG CLASS C	PAGES 11	REV CLASS C
JUST 22	NEXT REV 2010	AUTH: HR 10-2

SECRET

5. At the present time only one recorder is being operated for remote reproductions. The FBIS offices in Quarters "I" are receiving unclassified material by telephone line from room 1333 "M" building. Interference from teletype machines on adjacent lines shows up as slight noise.

Monitored Copy

Received Copy

SECRET

SECRET

6. Electrolytic recording paper development continues with the ultimate goal a high speed, high contrast, dry, permanent paper which can be used as an offset master if desired. Other characteristics desirable in the paper is long time storage while covered or uncovered without fading or staining adjacent material.

The following samples are part of approximately 50 experimental stages of paper developed for the Faxcard equipment.

The search continues for a high speed, short process, light sensitive paper for CRT exposure to replace electrolytic papers. The mechanical difficulties involved in electrolytic recording places a major limitation on the recording speed.

~~CONFIDENTIAL~~

~~SECURITY INFORMATION~~

7. A paper folding device mentioned in Reference (A), 3, B, (10), is badly needed. At the present time, the recorders roll out an average of 600' to 800' of paper per day. This has to be alternately folded by hand. A tentative design has been worked up on paper. The estimated cost of development is in the order of \$1,500.00. Once developed, production models should cost no more than \$300.00.

~~CONFIDENTIAL~~

~~SECURITY INFORMATION~~

CONFIDENTIAL

TECHNICAL INFORMATION

8. As illustrated by Enclosure (B), the demand on the equipment is increasing the work load to a point where one of two things have to happen. More equipment will have to be procured or the speed of the existing equipment increased. Since an increase in speed is desirable in any event, one recorder has been placed in the Engineering Division Shop for modifications. The speed will be increased from 900 RPM to 1800RPM. The changes necessary on the scanner which can be accomplished locally, consists of a gear ratio change in the card feed rollers, a change in the sweep rate from 15 to 30 sweeps per second, and a change in the carrier frequency from 6 to 12 KC. If successful, neglecting line transmission difficulties, the modification will make possible the transmission and reception of 18 lineal inches of copy per minute, an increase of 100% in equipment availability. The sample below was made with a rather crudely jerry rigged 1800 RPM recorder. No change was effected in transmitter card feed mechanism. (The transmitter had been placed out of commission due to lack of sweep linearity.)

CONFIDENTIAL

CONFIDENTIAL

9. Investigative work continues toward the development and perfection of a high speed facsimile recorder for $8\frac{1}{2}$ " copy. The target speed for the equipment is one letter size $8" \times 10\frac{1}{2}"$ in 30 seconds. The closest approach to the recorder desired is an $8\frac{1}{2}"$ conventional facsimile recorder geared to 1800 RPM. With a requirement of 100 line/inch definition, this would allow $10\frac{1}{2}"$ of copy in 35 seconds. Frequency considerations preclude the use of the equipment over ordinary telephone lines.

The following samples were obtained from equipment in use and/or in the development stage:

- A. [redacted] 1800 RPM - 103 lines/inch definition. Produced on modified standard facsimile equipment in 1946. No development known to be under-way. 50X1
- B. [redacted] 1800 RPM - 105 lines/inch definition. Produced on equipment developed for the Navy in 1950. Still in the developmental stage. 50X1
- C. [redacted] 1800 RPM - 120 lines/inch definition. Produced on equipment developed for the Atomic Energy Commission in 1950. Still in the developmental stage. 50X1

CONFIDENTIAL

CONFIDENTIAL

~~CONFIDENTIAL~~

SECURITY INFORMATION

[redacted], an Engineering Consultant hired by OCD to investigate microfilm scanning and recording techniques, has also been conducting experimental work toward a satisfactory 8" - 1800 RPM recorder. A standard 360 RPM recorder, obtained from [redacted]

50X1

[redacted] is being modified to 1800 RPM. The general construction of the recorder does not lend itself to high speed work. To date, the modification is incomplete.

50X1

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~~~SECRET~~

10. Experimental work involving facsimile reproduction from 35mm microfilm has been conducted. Results have been encouraging considering the limitations of the jerry rig constructed for the experiments and the limitations of the 5WP15 cathode ray tube, in regard to spot size, phosphor characteristics, etc. One column of newsprint, reduced on microfilm by a ratio of 16 to 1, was scanned and brought back to normal size using the Faxcard 900 RPM recorder. The ideal spot size required to effect 100 line definition in the reproduction is in the order of .000620" in diameter. The minimum spot size available for the experiments, obtained by a 4 to 1 optical reduction of a supposedly .010" spot, was in the order of .00250" in diameter. As can be readily observed from the attached copy, the definition has suffered accordingly. No detailed study has been made of the crystalline structure of the phosphor coating and attendant light dispersion characteristics.

~~CONFIDENTIAL~~~~SECRET~~

11. Some experimental work has been conducted toward storage of Intellofax information on magnetic tape. Primarily, the idea was submitted as a possible solution to the card storage problem involving cards containing stale information. Space requirements, magnetic tape over IBM cards, would be reduced by a factor of more than 100 to 1. Secondly, the idea was submitted as a means of placing specific information on Intellofax tapes with regard to routing, security, numbering, card count, dating, etc., simultaneous with the transmission of a request.

The sample below was made without benefit of a synchronizer tie-up between the tape recorder and facsimile receiver, and without sufficient impedance matching equipment.

The tape recorder used for the tests was an Ampex 400A. The 400A is a high quality recorder, however, it was impossible to maintain a stable 1 to 1 Lissajons figure with a base frequency of 1000 cycles.

CONFIDENTIAL

TELETYPE INFORMATION

12. Facsimile equipment owned by the Agency, other than Faxcard and specialized equipment for field use, consists of the [redacted] The [redacted] a self contained dual drum unit designed primarily for duplicating purposes, finds little use at present due to speed of transmission, type of paper used, and odor emitted. The equipment, if operating properly, will reproduce a 8 1/2 x 11 sheet in approximately 5 minutes. It is also capable of making stencils for mimeograph copy. The future outlook for this equipment is rather dim in view of the rapidly changing present day techniques toward high speed reproduction.

50X1
50X1

CONFIDENTIAL

SECURITY INFORMATION

13. Investigative work continues toward a suitable scrambling device for the Faxcard equipment. To date, explorative contacts have been made with several of the major facsimile concerns, two of which have offered to submit proposals covering requirements. The Machine Division, OCD, has attempted to push the development of scrambling equipment on several occasions during the past four years; however, due to the state of readiness of the Faxcard equipment for immediate remote reproduction, the proposed development has been discouraged beyond the planning stage. A contributing factor toward this attitude has possibly been the idea that the operation of all equipment could be restricted to an area where sufficient security exists. With the continuing expansion of facilities, this is no longer true.

It is a strong contention of the writer that any specialized equipment designed to transmit classified information over conventional, unrestricted lines or media, should be supplemented with a scrambling counterpart, the development of which should run concurrently with the development of the special equipment.

14. The Machine Division, OCD, has among its future plans involving the art of facsimile and adjacent fields, the following:

- A. To pursue the development of a suitable scrambling device for the Faxcard equipment.
- B. To assist the Library after the reduction of documents to microfilm in the processing of requests for information by electronic or photographic means, or a combination of both, for local or remote reproduction.
- C. To set up and maintain receiving and transmitting units between the Stadium, "M" building, "L" building and Quarters "I".
- D. To continue explorative investigations into the art of facsimile and adjacent fields potentially beneficial to the Agency.

15. The close liaison existing between the Machine Division, OCD and the Engineering Division, OC has been increasingly advantageous. If the present arrangement is disturbed, it is strongly requested that suitable steps be taken to insure coverage and service in the development program outlined in 14 above.

STAT

cc: AD/OCD
MD
File